conditions of thunderstorms, and an investigation of the effects of the earthquake at Florence on May 18 last, by C. Bassani.

AN examination of the gases liberated from certain of the sulphurous waters of the Pyrenees reveals, in the hands of M. Ch. Bouchard, the interesting fact that the formerly assumed nitrogen (from which the Spanish physicians have named these waters *azoades*) consists in part of free argon and helium. The collected gas was in each case, after treatment with potash and phosphoric anhydride, introduced into a Plücker tube containing magnesium wire. Under the action of the silent discharge the nitrogen rapidly disappeared by combination with magnesium, leaving a residue exhibiting the characteristic rays of both argon and helium for the gas derived from the waters of la Raillère, helium from the springs of Bois, and helium together with probably an unknown gas from the waters of lowest temperature at Bois.

THE use of magnesium wire and the silent discharge is due to MM. L. Troost and L. Ouvrard, who show that the magnesium vapour produced very rapidly combines with nitrogen under the conditions obtaining in the tubes. Further, the continued action of a powerful silent discharge, for some hours after the spectroscopic evidence proves the absence of nitrogen, results in a gradual diminution in intensity of the helium and argon rays. Finally a complete vacuum is produced, hence it appears that magnesium combines with argon and helium under these circumstances. Platinum appears to behave like magnesium towards argon in Plücker tubes with the silent discharge.

THE additions to the Zoological Society's Gardens during the past week include a Bonnet Monkey (*Macacus sinicus*, ♀) from India, presented by Mrs. Ball; an Emu (*Dromæus novæ-hollandiæ*) from Australia, presented by Mr. C. W. Williams; a Raven (*Corvus corax*), British, presented by Mr. W. Weeker; a Royal Python (*Python reginis*) from Dahomey, West Africa, presented by Mr. C. H. Harley-Moseley; a Common Chameleon (*Chamæleon vulgaris*) from North Africa, presented by Mr. C. Sampson; a —— Snake (*Phrynonax eutropis*), a —— Snake (*Phrynonax fasciatus*) from Trinidad, presented by Mr. R. R. Mole; a White-tailed Sea Eagle (*Haliætus albieilla*) from Scotland, two Diamond Snakes (*Morelia spilotes*) from Australia, deposited; eight Amherst Pheasants (*Thaumalea amherstiæ*), six Ring-necked Pheasants (*Phasianus torquatus*), two Japanese Pheasants (*Phasianus versicolor*), a Temminck's Tragopan (*Ceriornis temmincki*), bred in the Gardens.

OUR ASTRONOMICAL COLUMN.

THE PROPER MOTION OF THE SUN.—In the September number of the *Bulletin Astronomique* M. Tisserand gives an interesting account of a method of determining the proper motion of the sun from stellar proper motions. Denoting by m and m' the values of the annual proper motions of the stars, c the space described by the sun in one year, this space being measured with the same unit as the distance (ρ) of the sun, and A and D the Right Ascension and Declination of the apex of the sun's way, the formulæ for reduction become

$$m \cos \delta = \frac{c}{\rho} \cos \mathrm{D} \sin (\alpha - \mathrm{A})$$

$$\frac{m'}{\cos \delta} = -\frac{c}{\rho} \sin \mathrm{D} + \frac{c}{\rho} \cos \mathrm{D} \tan \delta \,.\, \cos (\alpha - \mathrm{A}).$$

In the second equation the second term changes its sign with $\tan \delta$, ρ changes its value from star to star. Assuming that the mean of the values of this term will be small or zero, and that Σ represents the arithmetical mean, we have—

$$\Sigma\left(\frac{m'}{\cos \delta}\right) = -c \sin \mathrm{D}\ \Sigma\left(\frac{1}{\rho}\right).$$

Now, because sin D is positive, the mean values of the left-hand side of the equation ought to be negative. If there were no proper motion to the sun, they should be zero.

Using the catalogue of 1054 stellar proper motions, motions of M. Stumpe (*Astr. Nach.*, Nos. 2999–3000, year 1890), only those stars have been employed the declinations of which are comprised between $-30°$ and $+30°$, and the proper motions less than $0''.64$.

The mean values for the sum above were then tabulated for every hour of Right Ascension. These were found to be all negative, as they ought to be, and they did not differ very much from one another. For 585 stars the mean value was $-0''.151$.

M. Tisserand further investigated the values obtained from another catalogue of 2641 stellar proper motions, by M. Bossert, in exactly the same way. Here the mean values were still found all to be negative, and not very different from one another. From 1537 proper motions the value obtained was $-0''.131$.

By taking only the proper motions of stars comprised between declinations $\pm 15°$, the value obtained does not differ materially from that given above. In the interval then of a century, for each hour of right ascension, the declinations of all the stars have diminished (in the mean) by quantities comprised between $10''$ and $20''$; and he says, "il nous semble que cela donne une preuve materielle frappante du mouvement du Soleil."

THE ROTATION OF VENUS.—A difficult problem in observational astronomy is the determination of the period of the rotation of Venus. M. Schiaparelli, whose powers of observations have been often put to the test, still thinks that the planet accomplishes one rotation in the same time that it takes to travel round the sun, or, in other words, the same hemisphere is always turned towards the sun. M. Leo Brunner, however, who has made during three months a great number of drawings, which appear to corroborate his statement, seems to be of quite a different opinion, for he says: "J'ai le plaisir de vous annoncer que je viens de découvrir la vraie période de rotation de Venus, qui ne diffère que de quelques minutes de celle de notre terre. Cette découverte est hors doute, car j'ai pu voir arriver et passer des taches plusieurs jours avec la plus grande distinction. Nul doute à cet egard." It must not be forgotten, however, that the observation of Venus is one attended by great difficulty. Even Brunner's drawings and those of Schiaparelli made of the planet at the same time are very different. There seems to be no doubt that the observations are all verging on the limit of visibility, and that the 224 days or the 24-hour period are just as probable as ever.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The following appointments have been recently made by the governing bodies of the undermentioned colleges:—At St. John's, Mr. R. H. Adie, a Lecturer in Natural Science; at Magdalene, Mr. G. T. Manley, Lecturer in Mathematics; at Trinity, Mr. G. T. Walker, Lecturer in Mathematics, and Messrs. W. C. D. Whetham and J. W. Capstick, Lecturers in Natural Science; at Emmanuel, Mr. A. Eicholz, Lecturer in Natural Science; at Sidney Sussex, Mr. R. H. D. Mayall, Lecturer in Mathematics; at Selwyn, Mr. L. A. Borradaile, Lecturer in Natural Science.

ACCORDING to *Science*, Prof. Bonnet, Professor of Anatomy in the University of Giessen, has received a call to Greifswald; and Dr. M. Miyoshi has been appointed Professor of Botany in the University of Tokyo.

MR. CHAS. BERRY, horticultural lecturer to the East Suffolk County Council Technical Instruction Committee, has been appointed Instructor in Horticulture by the Devonshire County Council, and will enter upon his duties at the end of September.

THE prospectus of Day and Evening Classes at the Battersea Polytechnic Institute for the session 1895-6, has reached us, and contains full information respecting the numerous classes held at this well-appointed institution. Several new classes are to be formed, and special provision is made for the needs of students who are desirous of entering for the examination of London University, from the matriculation to the final B.Sc.

THE fourth annual report (1894-5) of the Department of Agriculture, Yorkshire College, Leeds, has been published, and shows clearly that a great deal of useful work has been carried on during the past twelve months, and has, on the whole, met with very satisfactory success. With one exception (that of the classes for elementary teachers) each branch has exhibited much growth. The lectures given to farmers and others were

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well attended, and the work of the lecturers was much assisted by the travelling libraries sent out by the Victoria University in connection with the various courses. A new departure was made by the institution of short lectures on poultry-keeping. At the close of the session examinations were held, at which 188 candidates from 26 centres presented themselves, and of this number 145 passed, 58 attaining distinction. The prospectus of the Courses in Agriculture, Session 1895-6, is now ready, and may be had on application to the Registrar.

THE Agricultural Department of the University College of North Wales, Bangor, has just issued its prospectus for the approaching session, in which all information respecting classes, &c., is given. Arrangements have been made by which farms in the neighbourhood of the college may be made use of by the professors and their students for practical instruction. The prospectus can be obtained from the Secretary.

THE *Technical World* says: "One of the most interesting experiments undertaken by the Durham College of Science is the provision of a series of agricultural stations, of which there are now about sixty in Northumberland, Cumberland, and Durham. At these stations practical instruction is given by means of experiment and demonstration in the science of agriculture. Manures are supplied to the stations from the college, where they are analysed and blended as may be required for the particular experiment, and the resultant crops are afterwards tested under the direction of the Professor of Agriculture. These experiments give valuable opportunities to students to observe the varying results obtained under the different conditions of soil and climate in the various districts of the North, and also provide useful data for agriculturists therein."

A NEW technical school was opened at Runcorn on August 31, by Sir John T. Brunner, M.P. The school was erected at a cost of £4200, and contains eleven class-rooms and a lecture-hall.

IN view of the forthcoming opening of the Medical Schools, the current issues of our contemporaries, the *Lancet* and *British Medical Journal*, are devoted almost exclusively to particulars likely to be of service to medical students. The *Chemical News* for September 6 is likewise a "student's number," and contains much information respecting the various schools of chemistry.

SOCIETIES AND ACADEMIES.

PARIS.

Academy of Sciences, September 2.—M. Fizeau in the chair.—The work of 1895 at Mont Blanc Observatory, by M. J. Janssen. Determinations of the intensity of gravity have been made with very delicate instruments at Grands-Mulets (3050 m.) and at Chamounix by M. Bigourdan. It is hoped to carry out a similar determination on the summit of Mont Blanc next year. All the parts of the 33 cm. parallactic telescope have been conveyed to the site at the head of the glacier where it is to be erected.—On the presence of argon and of helium in certain mineral waters, by M. Ch. Bouchard. (See Notes, p. 487).—On the combination of magnesium with argon and with helium, by MM. L. Troost and L. Ouvrard. (See Notes, p. 487).—On a continuous group of transformations with twenty-eight parameters which occurs in the theory of deformation of surfaces, by M. Paul Staeckel.—Researches on the combinations of mercuric cyanide with bromides, by M. Raoul Varet. Thermochemical data are given for a number of compounds of the general type $2HgCy_2.MBr_2.xH_2O$. It is shown that in solution these substances yield but a slight isopurpurate reaction, and slightly redden litmus. With heat the effect is increased. The substances possess a similar constitution to the chlorocyanides, the cyanogen remaining mostly in combination with the mercury. Rather a greater proportion of the cyanogen passes over to the second metal than in the case of the chlorocyanides. A slight evolution of heat occurs in the change, a result contrary to what would be expected from the character of the iodo-compounds.—On the formation of hydrogen selenide, by M. H. Pélabon. Liquid selenium absorbs hydrogen selenide. Carrying out experiments on the formation of hydrogen selenide in relation to temperature with the smallest excess of selenium in order to avoid this source of error, it is found that the formula of Gibbs and Duhem,

$$\log \frac{p_1}{p_2} = \frac{M}{T} + N \log T + S,$$

accurately represents the experimental results (p_1 and p_2 represent the partial pressures of H and SeH_2, T is the abs. temp. of experiment, log means Napierian log, M, N, and S are constants). The ratio $\rho = \frac{p_2}{p_1 + p_2}$ has a maximum value at a temperature $t = \frac{M}{N} - 273$. With values of the constants calculated from the experimental results, $t = 575°$, the experimental maximum agrees with this result. The molecular heat of formation calculated by Duhem's formula with the found values for the above constants is - 17380 Cal., Fabre found - 18000 Cal. The difference is not great, and may be readily accounted for when it is remembered that (1) in this formula hydrogen and hydrogen selenide have been assumed to be perfect gases; (2) the formula has been applied beyond the limits of temperature of the experiments from which M and N are determined.—Action of carbonic acid, water, and alkalis on cyanuric acid and its dissolved sodium and potassium salts, by M. Paul Lemoult. A heat of neutralisation paper in which the decomposition of cyanuric acid slowly occurring in presence of bases is shown to agree with the equation $C_3N_3O_3H_3$ diss. + $3H_2O$ + Aq = $3CO_2$ diss. + $3NH_3$ diss. + 200 Cal.—The eclipsoscope, an apparatus for viewing the chromosphere and solar protuberances, by M. Ch. V. Zenger.—M. Ch. V. Zenger sends another note relative to the possibility of predicting great seismic and atmospheric disturbances during the passage of periodic swarms of shooting-stars when great activity of the solar surface is observed at the same time.

BOOKS, PAMPHLET, and SERIALS RECEIVED.

BOOKS.—The Herschels and Modern Astronomy: A. M. Clerke (Cassell).—The Growth of the Brain: Prof. H. H. Donaldson (Scott).—Peasant Rents (Economic Classics): R. Jones, 1831 (Macmillan).—Cubature des Terrasses et Mouvement des Terres: G. Dariès (Paris, Gauthier-Villars).—Quantitative Chemical Analysis: Clowes and Coleman, 3rd edition (Churchill).—Notes on the Nebular Theory in relation to Stellar, Solar, Planetary, Cometary, and Geological Phenomena: W. F. Stanley (K. Paul).—On the Structure of Greek Tribal Society: H. E. Seebohm (Macmillan).—Observations and Researches made at the Hong Kong Observatory in the Year 1894: Dr. W. Doberck (Hong Kong).

PAMPHLET.—The Movements of the Kosi River: F. A. Shillingford (Calcutta).

SERIALS.—Science Progress, September (Scientific Press).—Proceedings of the Physical Society of London, September (Taylor and Francis).—Himmel und Erde, September (Berlin).—Journal of the Asiatic Society of Bengal, Vol. lxiv. Part 2, No. 2 (Calcutta).—Journal of the Franklin Institute, September (Philadelphia).—Memoirs and Proceedings of the Manchester Literary and Philosophical Society, Fourth Series, Vol. 9, Nos. 3, 4, 5, (Manchester).—American Journal of Science, September (New Haven).

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